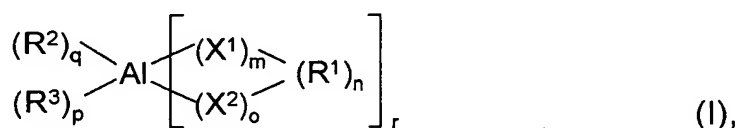


## PATENT CLAIMS

1. Process for the preparation of co- or terpolymers from olefins, characterised in that compounds of the general formula (I)



in which

$X^1$  denotes NR, PR, O or S, optionally complex-bonded to aluminium

$X^2$  denotes NRR', PRR', OR, SR, complex-bonded to aluminium

$R^1$  denotes linear or branched alkylene, cycloalkylidene, alkenylene, arylene, silylene, all of which may contain hetero atoms, such as N, P, O, S, F or  $X^1$  or  $X^2$ , optionally complex-bonded to aluminium

$R^2, R^3$ , independently of one another, denote linear or branched alkyl, cycloalkyl, alkenyl, aryl, alkynyl, silyl, H, F, Cl, Br, I or  $X^2$ , each of which may itself be partially fluorinated or perfluorinated

$R, R'$ , independently of one another, denote linear or branched alkyl, cycloalkyl, alkenyl, aryl, alkynyl, silyl or H, each of which may itself be partially fluorinated or perfluorinated

$m$  denotes 0, 1

$n$  denotes 1, 2, 3, 4, 5, 6, 7; if  $n > 1$ ,  $R^1$  may, independently of one another, adopt different meanings

o denotes 0, 1

p, q denote 0, 1, 2

5 r denotes  $3 - p - q$ ,

are used as components or cocatalysts (A) in coordination catalyst systems, where the latter in turn consist of (A), (B) a titanium- or vanadium-containing mixed catalyst and optionally (C) a support based on  $MgCl_2$  or  $SiO_2$  or  $SiO_2$  in combination with  $MgCl_2$ .

2. Process according to Claims 1, characterised in that the polymerisation reactions are carried out as mass or bulk polymerisations in which monomers are used as solvent, solution polymerisations in a suitable solvent, suspension polymerisations in a suitable inactive solvent or as gas-phase polymerisations.

3. Process according to Claims 1 and 2, characterised in that components (A), (B) and optionally (C) are, for assembly of the coordination catalyst systems, dissolved or suspended, before their use in the polymerisation reaction, in an inert hydrocarbon, such as propane, butane, pentane, hexane, octane, decane, cyclic hydrocarbon, such as cyclopentane, cyclohexane, methylcyclopentane, aromatic hydrocarbon, such as benzene, toluene or xylene, a halogenated hydrocarbon, such as ethylene chloride, chlorobenzene or dichloromethane, or mixtures thereof as solvent.

4. Process according to Claims 1 and 2, characterised in that the polymerisation reaction is carried out as solution polymerisation, where an aromatic hydrocarbon, such as benzene, toluene, xylene or ethylbenzene, or a cyclic hydrocarbon, such as cyclopentane or methylcyclohexane or an aliphatic hydrocarbon, such as pentane, hexane, heptane, or octane, or a halogenated hydrocarbons, such as chloroform or dichloromethane, or mixtures thereof or a monomer are employed as solvent.

5. Process according to one or more of Claims 1 to 4, characterised in that the co- or terpolymerisation is carried out at a temperature in the range from -20 to 120°C at a pressure in the range from atmospheric pressure to 6 bar.
6. Process according to one or more of Claims 1 to 5, characterised in that the co- or terpolymerisation is carried out at a temperature in the range from 0 to 100°C.
7. Process according to one or more of Claims 1 to 6, characterised in that the olefins used are at least two olefinically unsaturated hydrocarbons selected from the group ethylene, C<sub>3</sub>- to C<sub>12</sub>-alk-1-enes, such as propene, 1-butene, isobutene, 1-pentene, 4-methyl-1-pentene, 1-hexene, 1-heptene, 1-octene, 1-nonene, 1-decene, 1-undecene, 1-dodecene, furthermore styrene,  $\alpha$ -methylstyrene, cycloolefins, such as cyclopentene, norbornene, dienes, such as 1,3-butadiene, 1,4-hexadiene, ethylidenenorbornene or norbornadiene.
8. Process according to one or more of Claims 1 to 6, characterised in that the olefins used are at least two olefinically unsaturated hydrocarbons selected from the group ethylene, propylene, 1-butene, 1-hexene, 1-octene, norbornene, butadiene and ethylidenenorbornene.
9. Process according to one or more of Claims 1 to 6, characterised in that the olefins used for the copolymerisation are ethene and propene or ethene and hexene or ethene and octene.
10. Process according to one or more of Claims 1 to 6, characterised in that the olefins used for the terpolymerisation are ethene, propene and ethylidenenorbornene.
11. Process according to one or more of Claims 1 to 6, characterised in that compounds selected from the group [3-(dimethylamino)propyl]dimethylaluminium,

5 [3-(dimethylamino)propyl]diethylaluminium,  
[3-(dimethylamino)propyl]dibutylaluminium,  
[3-(diethylamino)propyl]dimethylaluminium,  
[3-(diethylamino)propyl]diethylaluminium,  
[3-(diethylamino)propyl]dibutylaluminium,  
[4-(dimethylamino)butyl]dimethylaluminium  
[4-(dimethylamino)butyl]diethylaluminium  
[4-(dimethylamino)butyl]dibutylaluminium  
10 [4-(diethylamino)butyl]dimethylaluminium  
[4-(diethylamino)butyl]diethylaluminium  
[4-(diethylamino)butyl]dibutylaluminium  
[2-(dimethylamino)phen-1-yl]dimethylaluminium,  
[2-(dimethylamino)phen-1-yl]diethylaluminium,  
[2-(dimethylamino)phen-1-yl]dibutylaluminium,  
15 [2-(diethylamino)phen-1-yl]dimethylaluminium,  
[2-(diethylamino)phen-1-yl]diethylaluminium,  
[2-(diethylamino)phen-1-yl]dibutylaluminium,  
[2-(dimethylamino)benzyl]dimethylaluminium,  
[2-(dimethylamino)benzyl]diethylaluminium,  
20 [2-(dimethylamino)benzyl]dibutylaluminium,  
[2-(diethylamino)benzyl]dimethylaluminium,  
[2-(diethylamino)benzyl]diethylaluminium,  
[2-(diethylamino)benzyl]dibutylaluminium,  
[2-(dimethylaminomethyl)phen-1-yl]dimethylaluminium,  
25 [2-(dimethylaminomethyl)phen-1-yl]diethylaluminium,  
[2-(dimethylaminomethyl)phen-1-yl]dibutylaluminium,  
[2-(diethylaminomethyl)phen-1-yl]dimethylaluminium,  
[2-(diethylaminomethyl)phen-1-yl]diethylaluminium,  
[2-(diethylaminomethyl)phen-1-yl]dibutylaluminium,  
30 [8-(dimethylamino)naphth-1-yl]dimethylaluminium,  
[8-(dimethylamino)naphth-1-yl]diethylaluminium,  
[8-(dimethylamino)naphth-1-yl]dibutylaluminium,  
[3-(methoxy)propyl]dimethylaluminium,  
[3-(methoxy)propyl]diethylaluminium,  
35 [3-(methoxy)propyl]dibutylaluminium,  
[3-(ethoxy)propyl]dimethylaluminium,

5 [3-(ethoxy)propyl]diethylaluminium,  
[3-(ethoxy)propyl]dibutylaluminium,  
[3-(butoxy)propyl]dimethylaluminium,  
[3-(butoxy)propyl]diethylaluminium,  
[3-(butoxy)propyl]dibutylaluminium,  
[2-(methoxy)phen-1-yl]dimethylaluminium,  
[2-(methoxy)phen-1-yl]diethylaluminium,  
[2-(methoxy)phen-1-yl]dibutylaluminium,  
10 [2-(methoxy)benzyl]dimethylaluminium,  
[2-(methoxy)benzyl]diethylaluminium,  
[2-(methoxy)benzyl]dibutylaluminium,  
[2-(methoxymethyl)phen-1-yl]dimethylaluminium,  
[2-(methoxymethyl)phen-1-yl]diethylaluminium,  
[2-(methoxymethyl)phen-1-yl]dibutylaluminium,  
15 [8-(methoxy)naphth-1-yl]dimethylaluminium,  
[8-(methoxy)naphth-1-yl]diethylaluminium,  
[8-(methoxy)naphth-1-yl]dibutylaluminium,  
[8-(ethoxy)naphth-1-yl]dimethylaluminium,  
[8-(ethoxy)naphth-1-yl]diethylaluminium and  
20 [8-(ethoxy)naphth-1-yl]dibutylaluminium  
are used as components or cocatalysts in coordination catalyst  
systems.

25 12. Process according to one or more of Claims 1 to 6, characterised  
in that compounds selected from the group  
[2-(methoxy)benzyl]dibutylaluminium,  
[3-(dimethylamino)propyl]dimethylaluminium,  
[3-(dimethylamino)propyl]diethylaluminium and  
[2-(diethylaminomethyl)phen-1-yl]diethylaluminium  
30 are used as components in coordination catalyst systems for the  
co- and terpolymerisation of olefins.

35 13. Process according to one or more of Claims 1 to 6, characterised  
in that compounds selected from the group  
[2-(methoxy)benzyl]dibutylaluminium,  
[3-(dimethylamino)propyl]diethylaluminium and

[2-(diethylaminomethyl)phen-1-yl]diethylaluminium  
are used as compounds in coordination catalyst systems for the  
copolymerisation of ethene with propene.

- 5 14. Process according to one or more of Claims 1 to 6, characterised  
in that  
[3-(dimethylamino)propyl]dimethylaluminium  
are used as components in coordination catalyst systems for the  
10 copolymerisation of ethene with hexene.
- 15 15. Process according to one or more of Claims 1 to 6, characterised  
in that  
[2-(diethylaminomethyl)phen-1-yl]diethylaluminium  
is used as component in coordination catalysts for the terpoly-  
15 merisation of ethylene, propylene and ethylidenenorbornene.
- 20 16. Ethylene-propene copolymer having a molecular weight in the  
range from 50,000 to 1,500,000 g/mol, obtainable by a process  
according to Claims 1 to 14.
- 25 17. Ethylene-propene copolymer according to Claim 16, having a  
molar ethylene / propene ratio of 1 : 99 to 99 : 1.
- 30 18. Ethylene-propene copolymer having a molar ethylene / propene  
ratio of 50 : 50 and a molecular weight in the range from 100,000  
to 200,000 g/mol, obtainable by a process according to Claims 1  
to 14.
- 35 19. Ethylene-propene-ethylidenenorbornene terpolymer having an  
ethylene / propene / ethylidenenorbornene ratio of  
 $X_{\text{ethylene}}: 0.5 - 0.9$ ,  $X_{\text{propylene}}: 0.05 - 0.3$ ,  $X_{\text{ethylidenenorbornene}}: 0.05 - 0.2$  mol,  
a molecular weight in the range from 50,000 to 1,000,000 g/mol,  
obtainable by a process according to Claims 1 to 14.
20. Ethylene-propene-ethylidenenorbornene terpolymer having an  
ethylene / propene / ethylidenenorbornene ratio of

$x_{\text{ethylene}}$ :0.75,  $x_{\text{propylene}}$ :0.2,  $x_{\text{ethylidenenorbornene}}$ :0.05 mol, a molecular weight of 100,000 g/mol and a glass transition temperature of  $T_g = -53^\circ\text{C}$ , obtainable by a process according to Claims 1 to 14.

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